Pacific Science (1975), Vol. 29, No. 4, p. 361–363
Printed in Great Britain

The Eel Genus *Phaenomonas* (Pisces, Ophichthidae)[1]

JOHN E. MCCOSKER[2]

SNAKE-EELS of the genus *Phaenomonas* Myers & Wade (1941) are among the most peculiar of living anguilliform fishes. Their physiognomy, extreme trunk elongation, and reduction of fins to but a short dorsal arising on the head and ending shortly thereafter suggest an extreme adaptation to a peculiar life style. Knowledge of this genus is based on the descriptions of two Pacific species known from three specimens. The subsequent capture of numerous specimens of *P. pinnata* Myers & Wade (1941) in the eastern Pacific and the discovery of museum specimens, taken primarily by the George Vanderbilt Expedition, and the capture of a Hawaiian specimen of *P. cooperae* Palmer (1970) have prompted this study.

The genus *Phaenomonas* may be distinguished from all other ophichthid genera in the following manner: body very elongate, nearly cylindrical for most of its length; head and trunk longer than tail; all fins absent except a short low dorsal originating just behind occiput and ending in anterior trunk region; tail tip blunt; gill openings lateral, oblique, and low on sides, nearly equal in length to isthmus width; snout blunt, its underside grooved; eye minute; jaw and vomerine teeth uniserial, small and pointed. *Phaenomonas cooperae* may be separated from the generic type, *P. pinnata*, on the basis of the former's longer dorsal fin, more slender body, more numerous vertebrae, and other characters listed in Table 1.

The eastern Pacific species, *P. pinnata*, was described from two specimens. The holotype, from Port Utria, Colombia, was dredged in 15–30 fathoms (27–55 m) over a sand and mud bottom. The single paratype was dredged on a coralline bottom near Isabel Island, Nayarit, Mexico. The subsequent use of rotenone ichthyocides has resulted in the collection of numerous specimens, generally from sand bottoms, between depths of 1–35 m. Specimens are now known from the southern Gulf of California (Mexico) (specimens deposited at SIO, UCLA, and UA), Costa Rica (UCR), Clipperton Island (UCLA), Galápagos Islands (UCLA), and Colombia (AHF). No significant differences in vertebral number (Table 2) or morphometry were discovered within the eastern Pacific population. Material examined included 75 specimens from 33 lots, varying in length from 118–535 mm, including the 221-mm holotype (AHF 13).

The Indo-West-Pacific species, *P. cooperae*, was described by Palmer (1970) from a single specimen collected in a shallow lagoon at the Gilbert Islands. In that the species was figured only from the radiograph, an illustration is provided here (Figure 1). Subsequent rotenone collections have extended the range of *P. cooperae* to include Hawaii (HIMB), the Red Sea (Israel, Strait of Jubal, USNM), Aldabra (ANSP, USNM), Palau (CAS), and the Marquesas Islands (BPBM). A single specimen (HIMB 68-52), dredged offshore from Keehi Lagoon, Oahu, Hawaii, falls within the range of meristic and morphometric variation of its Indo-West-Pacific conspecifics. Material examined of *P. cooperae* included 44 specimens from six lots, varying in length from 324–587 mm.

Little is known of the life history of these curiously adapted eels. Their extreme specialization toward a burrowing vermiform existence, not unlike that of species of *Bascanichthys*, *Allips*, and *Moringua*, is evidenced in their minute eyes, elongate body, and fin loss (cf. McCosker 1972). An analysis of their gut contents revealed primarily sand grains, but no plant or animal remains. This might suggest that they, in a manner not unlike a terrestrial earthworm, eat all that they encounter and digest and utilize whatever nutritive material it contains. The extreme elongation of the trunk region and simple direct alimentary tract, unlike that of most other eels whose tract is convoluted and often enters the tail region, appear necessary for

[1] Manuscript received 19 December 1974.
[2] California Academy of Sciences, Steinhart Aquarium, Golden Gate Park, San Francisco, California 94118.

TABLE 1

COUNTS, AND PROPORTIONS IN THOUSANDTHS OF TOTAL LENGTH, OF THE SPECIES OF *Phaenomonas*

ITEM	*Phaenomonas cooperae* $\bar{x}$	*Phaenomonas cooperae* RANGE	*Phaenomonas pinnata* $\bar{x}$	*Phaenomonas pinnata* RANGE
Total Length	–	324–587 mm	–	215–490 mm
Head	34	32–38	58	51–63
Trunk	666	655–675	602	580–640
Tail	302	293–308	342	313–360
Dorsal Fin Origin	16	14–18	33	28–35
Dorsal Fin Length	125	104–144	86	69–95
Body Depth	7.5	6.6–8.5	15	12–17
Eye Diameter	1.6	1.4–1.9	2.2	1.6–2.7
Upper Jaw	7.4	7.0–8.4	14	12–15
Lower Jaw	5.5	4.5–5.8	8.8	6.6–10.1
Snout	5.1	4.2–5.8	9.5	7.8–10.7
Vertebrae	256	243–270	186.5	175–194

NOTE: Data based on 11 specimens of each species, except vertebrae, for which *P. cooperae* is 9 specimens and *P. pinnata* is 14.

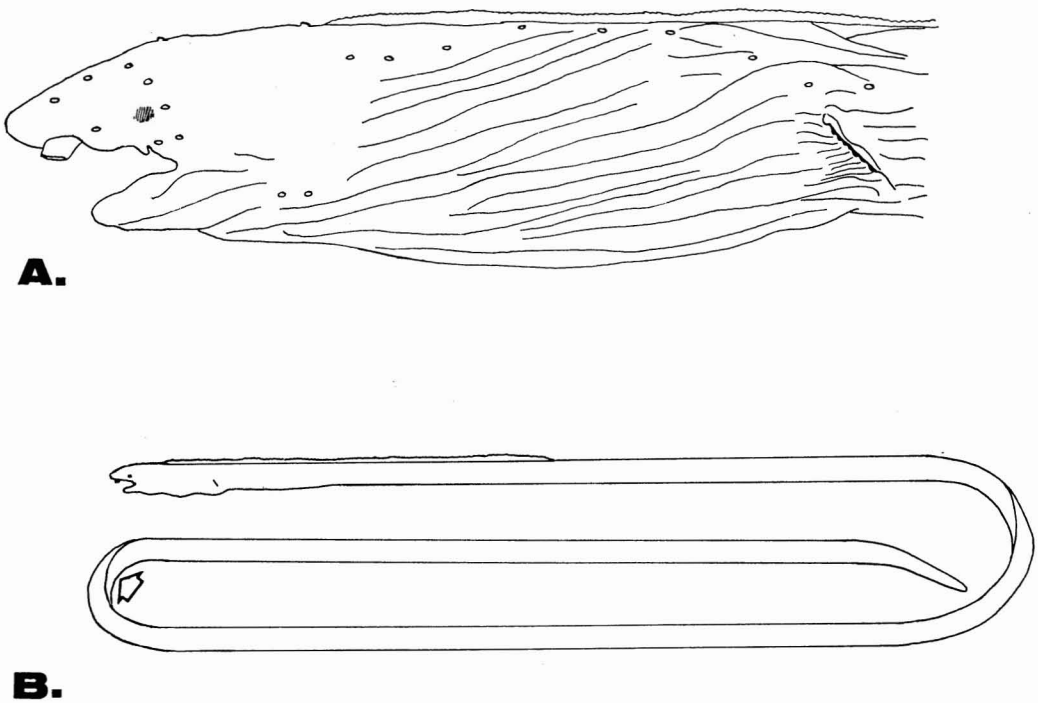

FIGURE 1. *Phaenomonas cooperae*, a 587-mm specimen from Palau, CAS 13964. *A*, head region; *B*, left lateral view.

such an existence. The coloration of living *Phaenomonas pinnata* (personal observation) and *P. cooperae* (J. E. Randall, personal communication) is pinkish throughout the head and trunk region and darker in the tail, not unlike that of living moringuid eels.

Thanks are due to the following for permission to examine specimens in their care: Wayne Baldwin, Hawaii Institute of Marine Biology (HIMB); William A. Bussing, Universidad de Costa Rica (UCR); James E. Böhlke, Academy of Natural Sciences of Philadelphia (ANSP);

TABLE 2

Total Vertebrae of Species of *Phaenomonas*

Species and site	$\bar{x}$	Range	N
Phaenomonas cooperae			
Aldabra	244.5	243–246	2
Palau	257	254–259	4
Gilbert Islands (holotype)	270	–	1
Marquesas	255	–	1
Hawaii	262	–	1
Phaenomonas pinnata			
Gulf of California	182	175–188	7
Clipperton Island	191	188–194	4
Galápagos Islands	192.5	192–193	2
Colombia (holotype)	187	–	1

William N. Eschmeyer, California Academy of Sciences (CAS); Lloyd T. Findley, University of Arizona (UA); Robert Kanazawa, National Museum of Natural History (USNM); Robert J. Lavenberg, Los Angeles County Museum of Natural History (AHF); John E. Randall, Bernice P. Bishop Museum (BPBM); Richard H. Rosenblatt, Scripps Institution of Oceanography (SIO); Boyd W. Walker and John Bleck, University of California at Los Angeles (UCLA). I also thank Cherryl Pape for the preparation and Maurice Giles for the photograph of the animal shown in Figure 1, Perry Heffelfinger for assistance with data collection, and William N. Eschmeyer for comment on this manuscript.

LITERATURE CITED

McCosker, J. E. 1972. Two new genera and two new species of western Pacific snake-eels (Apodes: Ophichthidae). Proc. Calif. Acad. Sci., 4th ser., 39(10): 111–120.

Myers, G. S., and C. B. Wade. 1941. Four new genera and ten new species of eels from the Pacific coast of tropical America. Allan Hancock Pacif. Exped. 9(4): 65–111, pls. 7–16.

Palmer, G. 1970. New records, and one new species, of teleost fishes from the Gilbert Islands. Bull. Brit. Mus. (Nat. Hist.), Zool., 19(6): 211–234.